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ABSTRACT

This booklet, the first in a series of four volumes on the Designing a Curriculum (Dacum) process, is intended to explain to Dacum workshop participants exactly what Dacum is and why it was created. The first section of the guide traces the development of Dacum as a program planning model that was established in the late 1960s in response to the need to solve practical training problems. Discussed next are new approaches to the Dacum process that were initiated in the mid-1970s at vocational and technical programs in colleges and universities across British Columbia. The third section of the guide, an outline of Dacum principles and procedures, deals with the following steps in the Dacum model: conducting a job analysis, establishing objectives, and designing instruction. The benefits provided by Dacum to learners, instructors, administrators, and employers are enumerated. Concluding the booklet are a list of available skill profile charts from the British Columbia Research and Development Branch, course outlines, and course objectives for a variety of vocational and technical education subject areas, as well as suggestions for further reading. (MN)

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This series is dedicated to
Derek Franklin, Howard Clement, Oliver Rice,
and all those other B.C. educators who believe
that learners have the right to know where they are going
and how they are going to get there.

Preface

This four-part series explains Dacum, an acronym for Designing a Curriculum. Dacum is a systematic method for developing career, technical, and vocational training programs. Modified versions of the Dacum model are used in a number of provinces across Canada by educational institutions, government agencies, and business and industry. In British Columbia, Dacum is used by the Research and Curriculum Development Branch of the Ministry of Education to develop curricula at the post-secondary level.

The four booklets in this series provide a detailed description of the major steps involved in the Dacum process. The booklets are:

1. **Introduction to Dacum**
2. **The Dacum Workshop**
3. **From Skill Profile to Objectives**
4. **From Objectives to Instruction**

The materials are designed for workshop participants, program developers and others in the training field.

This booklet, **Introduction to Dacum**, explains what the system is and why it was created. It explores the evolution of Dacum as a competence-based approach to curriculum design and describes who was involved with its development in British Columbia. The booklet also introduces the major steps in the Dacum process, which are examined in more detail in the three remaining booklets.

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Introduction

Dacum was coined as an acronym for "designing a curriculum." When the Dacum method was developed during the late sixties in British Columbia, it was described as "an example of a systems approach to instruction." Since then, it has evolved into a **program planning** model, which is used to analyze a job or occupational area, describe training goals, and recommend instructional approaches to achieve these goals.

From its initial development, Dacum has changed dramatically. This booklet explains how the Dacum process began in British Columbia, who developed it, and what forces shaped its evolution over the past seventeen years. Other educators and trainers throughout Canada have taken the fundamental idea and adapted it to suit their own requirements. As a result, there is now a great diversity of opinion about what Dacum is and how it is applied.

The four booklets in this series do not presume to account for all the interpretations of Dacum, but rather to explain the system as it is used in British Columbia. The series has been written primarily for instructors, administrators, and advisory groups in the B.C. Post-Secondary system. However, Dacum can easily be adapted to meet the needs of private industry and can be applied to any situation where training occurs.

A Historical Perspective

Dacum was developed out of a need to solve practical training problems. In July 1965, a federal-provincial conference recommended that the federal government initiate a number of action-research projects in cooperation with the provinces to study the total training needs of various areas in Canada. An Experimental Projects Branch was formed in the Department of Manpower to examine training methods that could be used by a group of new training facilities set up under the terms of the conference. These facilities, called NewStart Corporations, were organized in participating provinces to explore new training approaches that could be implemented in small, isolated Canadian communities.

Officials of the Experimental Projects Branch travelled extensively, examining programs and techniques being used throughout North

America. Howard Clement, one of the officials, came across a new method of program planning in Clinton, Iowa, at the Clinton Job Corps Centre. The centre, operated by Dr. Oliver Rice of the General Learning Corporation of New York, was a large residential training institution. It was created, according to Dr. Rice, "to guide young women between the ages of 16 and 21, who were not employed or in school, and whose families were incapable of adequate support, into more effective and rewarding roles as breadwinners, homemakers and citizens." Intensive counselling plus the residential aspect of this institution helped many of the young women become better adjusted socially. Many, however, at first had some difficulty with the training aspect of the program.

In order to motivate the students to participate in the training program, Dr. Rice devised a method of charting the entire curriculum for each student and stating the objectives in clear, behavioural terms. A copy of the chart was given to each young woman upon entry. She was then encouraged to colour in each objective on the chart as she completed it.

The advantage of this approach was readily apparent and helped contribute to the success of the vocational training programs at Clinton. Because the curriculum was presented in chart form, it could be seen in its entirety at a glance. Each student could easily see the structure and sequences involved in her own program. She could always keep track of how much she had completed and how much remained to be done. With each module stated in specific behavioural terms, students could clearly identify the skill level required for success and work towards attaining that level. Because the entire program was charted, sub-trades were easy to identify, so that any student unable to continue her training could elect to follow an abbreviated program that would still provide her with employable skills.

The charts offered several other advantages as well. Program planners could use them to identify elements common to several programs, which could then be grouped together into more efficient training events. Administrators could use the charts to identify the costs of equipment, facilities, and staff. Instructors could use the chart as a blueprint to develop self-instructional materials. Finally, it became easier to allow students to transfer from one program to

another if their interests changed or if they needed more help to develop their skills.

In 1968, as a result of his success with the curriculum charting method at Clinton, Dr. Rice was invited by the Canadian Department of Manpower to work with Howard Clement to produce materials for distribution to the NewStart Corporations. The Division of Technical/Vocational Curriculum in the B.C. Department of Education, under the direction of Derek Franklin, was contracted to work with Dr. Rice and Mr. Clement on both the development and the production phases of the project. A number of materials were produced including charts, workbooks, transparencies, programmed texts, and a film demonstrating the process of charting a curriculum. In addition, a text, **Designing a Curriculum (DACUM)**, was published by the federal Department of Regional Economic Expansion in 1969.

Dacum: Then and Now

Ironically, though Dacum was first developed in British Columbia, the system enjoyed greater popularity in provinces other than B.C. — notably the Maritime Provinces. Regional modifications in the approach were developed in centres like Holland College (P.E.I.), New Brunswick Community College, the Nova Scotia Department of Education, the Centre for Research and Development in Alberta, and the Newfoundland Division of Technical and Vocational Education.

In the mid-seventies, as the vocational institutes were starting to meld with the newly-emerging community colleges in British Colum-

bia, the role of the Department of Education began to change. The old Division of Technical/Vocational Curriculum, which provided direct curriculum development services to the vocational schools, gave way to the Program Research and Development Branch in the newly-created Program Services Division. Among the many responsibilities of the Branch was the job of assisting college and institute instructors and administrators to develop their own curricula in cooperation with each other and with employers in the province. The role of the Program Services group was to coordinate these efforts.

In 1976 a special project was developed in cooperation with the Centre for Continuing Education at the University of British Columbia to promote a new approach to Dacum to all the colleges and institutes in B.C. A new series of booklets and videotapes was produced and the project staff conducted a series of workshops with instructors and administrators throughout the province to re-introduce the Dacum system. At the same time, the Branch was actively involved in applying the Dacum approach to the development of curriculum guidelines for province-wide training programs. (A detailed list of the various projects is presented on pages 9 to 11.)

Throughout its evolution in B.C., the Dacum process has been influenced by two major factors: changes in the organization of post-secondary education and the development of knowledge about how people learn. When Dacum was first created, responsibility for curriculum development was centralized through the former Department of Education. In recent years, the Ministry of Education has acknowledged the impracticality of fully developing and packaging curriculum materials for all of the 400 or more post-secondary career, technical, and vocational programs which are part of its responsibility. Instead, the Ministry has sponsored a number of program development projects in the areas of highest priority to meet provincial needs.

Along with jurisdictional changes, there have also been changes in what the process itself involves. Originally the Dacum system included all the developmental stages in curriculum design, from identifying the skills to producing the instructional plans and resources. However, the instructional plans created by Dacum program developers could be used only as guidelines by the instructors, who needed to modify them to meet the individual needs of their learners

and to work within the constraints imposed by their own institutions.

With new developments in the theories of adult learning, it has become clear that there is a distinction between curriculum and instruction. Curriculum describes what skills the learner needs to acquire to be competent in a particular occupation; instruction is the means by which the instructor assists the learner to achieve these outcomes. A curriculum outline must be valid and generally reflect the needs of all the parties concerned, including the learner, the educational institution, and the employer who will hire the graduate. The instructional process, on the other hand, needs to be flexible enough to deal with the more specific needs of the learner, and it depends upon the skills and resources of the instructor.

The history of Dacum has been one of refinement and evolution reflecting the changes which have occurred in post-secondary education in British Columbia. In this series of booklets, Dacum is characterized as a methodology for analyzing and describing learning outcomes. It is a procedure for designing programs. It is not a system of instruction.

Dacum: Principles and Procedures

Regardless of who uses the Dacum approach, and whether it is used to develop a small training course for a few workers in a particular company or a complete program for an entire occupational area, the basic principles remain the same. Dacum, like other competence-based approaches to program development, places the emphasis on the learner's meeting specific objectives to a set standard. A task analysis approach is used to identify precise learning outcomes. These outcomes represent the training goals which have been identified by individuals who work in the field under study.

The first two steps in the process involve the development of curriculum guidelines through a cooperative effort between program developers and expert practitioners from a given job or occupational area.

> Step 1 is to **conduct a job analysis** to determine the range of skills required to perform the job. This is generally done in a workshop setting. The product of the workshop is a skill profile chart (Dacum chart) which documents all the required skills in specific behavioural terms. (See booklet 2 of this

series, **The Dacum Workshop**, for a detailed description.)

Step 2 is to **establish objectives** which reflect the required skills or outcomes documented on the skill profile chart. Not all these skills can be learned in a formal instructional setting. Some must be learned on the job. As a rule, only those outcomes which can be achieved in a training setting are included in the curriculum plan. (See booklet 3 of this series, **From Skill Profile to Objectives**, for details of this procedure.)

Traditionally, these first two steps in the Dacum process have been initiated and coordinated by the Ministry of Education in response to the needs of the province at large. The charts and outlines of objectives have been published, and colleges or institutes have then been encouraged to use them as a basis for designing instruction in their own institutions. Colleges, institutes, and local industries have also used the system to develop very specific programs to meet local needs.

In the third major step in Dacum, instructors take the curriculum guidelines (the charts and objectives) and adapt them to fit into existing training programs, or use them to develop completely new courses. This process of instructional design occurs at the local level where it is the responsibility of the college or institute to ensure that the training goals are achieved.

Step 3, **design instruction**, involves a number of stages to translate the skill profile chart and the objectives into an instructional program. The various stages of instructional design include:

a. *Writing instructional objectives* which may or may not be identical with the Dacum objectives. Sometimes the Dacum objectives are too broad to be applied to the instructional setting. At other times, these objectives may call for resources not available to instructors in some institutions. It then becomes the instructor's responsibility to redefine the objectives to reflect the needs of the learners and the institutional constraints which may exist.

b. *Designing instructional plans* (sometimes referred to as "lesson plans") which break down the objectives into learning tasks and list the types of instructional techniques and resources to be used.

c. *Selecting or developing evaluation instruments* to measure whether the objectives have been met by the learners. Any competence-based system, in the final analysis, is only worthwhile if the learners have achieved the objectives to an acceptable level of performance. Instruments for measuring the learner's progress and achievement are a crucial element in the design of instruction. (See booklet 4, **From Objectives to Instruction**, for a more detailed description of these procedures.)

In the past, the Ministry of Education endeavoured to work with instructors to completely develop a curriculum through all three steps. In recent years, the Ministry has sponsored a number of programs to help instructors develop the skills to carry out these steps independently. A detailed description of these programs, as well as their resources, is provided in the fourth and last booklet in this series, **From Objectives to Instruction**.

In Summary

In the past, the development of curricula at all levels of education has often been based upon the availability of textbooks or resource materials and the expertise of individual instructors. While this approach has worked, it has been found that a systematic method, based on specific learning outcomes, better serves the needs of both instructors and learners. The difference between these approaches can best be compared to the differences between traditional and management-by-objectives approaches to organizational development.

Dacum is analagous to a management-by-objectives approach in that it is a systematic process which begins with the establishment of specific goals and works "backwards" to determine all of the resources required to reach the training goal. Dacum is particularly suited to the development of vocational, technical, and career training programs, where the ultimate goal is to prepare individuals for employment. Underlying the Dacum approach is an important shift in emphasis from the traditional concern with what individuals **know**, to what they can **do** competently as a result of training. This practical, goal-oriented approach is generally described as performance-based or competence-based education.

There are numerous advantages to Dacum, not only for learners, instructors, and administrators, but also for prospective employers of trained graduates.

For learners, the benefits include:

- A clearly defined set of objectives and criteria for evaluation which provide an overall sense of direction
- Assurance that what is being taught is applicable to future employment in their chosen field

For instructors and administrators, the benefits include:

- A logical and thorough process for determining and developing learning resources, teaching techniques, testing procedures, and space and equipment requirements
- Flexibility to adapt the general curriculum to meet regional or local needs
- Assurance that the program objectives are relevant to the learners' future employment possibilities

- A curriculum which can be readily modified and updated to reflect the changing needs of the workplace

For employers in business, industry and the professions, the benefits include:

- An opportunity to participate directly in both the initial and the ongoing development of training which meets their specific needs
- A process for negotiating with educators and training institutions to determine which skills are best taught in the classroom, and which are most appropriate for on-the-job training
- Assurance that graduates of these programs have been exposed to a valid, standardized curriculum which is relevant to current needs in the field
- An indication of what level of competence of skill the learner has achieved before entering the workplace

Skill Profile Charts and Course Outlines

Research and Curriculum Development has printed many skill profile charts over the last fifteen years. Recent charts include:

Bricklaying
Dental Receptionist
Core Drafting
Drywall Finishing
General Mechanics
Hospital Clerical Worker
Housekeeping Level 1
  Room Attendant
Medical-Dental Health Clerical Support Staff
Medical Office Assistant
Open Pit Mining Job Training Series:
  Haulage Truck Operator
  Track Dozer Operator
  Rubber Tire Dozer Operator
  Front End Loader Operator
  Grader Operator
Travel Agent
Travel Counsellor
Waiter/Waitress Introduction to Food Service

Waiter/Waitress Level II
Waiter/Waitress Level III
Waiter/Waitress Advanced Hosting Skills

The preceding charts are available from:

Publication Services Branch
Ministry of Education
878 Viewfield Road
Victoria, B.C. V9A 4V1
Telephone: (604) 387-5331

The cost is 75 cents each, or ten for $5, plus 10% shipping charges. See the **Catalogue of Learning Resources** for other materials distributed by Publication Services.

In addition, these charts and many more (over 800) are available for viewing or borrowing from:

Provincial Post-Secondary Resource Centre
Ministry of Education
2nd Floor, 7451 Elmbridge Way
Richmond, B.C. V6X 1B8
Telephone: (604) 278-3433
Telex: 04-357797

Besides skill profile charts, Research and Curriculum Development has published many sets of course objectives commonly referred to as course outlines. Recent ones include:

Aircraft Sheet Metal
Aircraft Maintenance
Band Social Service Worker
Competencies for Dental Hygiene in British Columbia
Competencies for Level II Dental Auxiliaries (Certified Dental Assistants) in British Columbia, Draft
Competencies for Practical Nursing
Competencies in Early Childhood Education
Core Drafting
Drywall Finishing Apprenticeship
General Mechanics

Heavy Duty Mechanic Apprenticeship
First Edition
Housekeeping Level 1
Room Attendant
Human Services Worker
(Mental Retardation)
Long Term Care Aide Competencies
Draft, Revised Edition
Medical-Dental Health Clerical Support Staff
Open Pit Mining Job Training Series:
Haulage Truck Operator
Track Dozer Operator
Rubber Tire Dozer Operator
Front End Loader Operator
Grader Operator
Retail Meat Processing
Pre-employment
Travel Counselling Techniques
(Basic)
Waiter/Waitress Training
Pre-employment

The preceding course outlines are available from Publication Services at a cost of $6 each plus 10% shipping charges. These outlines and many more are also available for viewing or borrowing from the Provincial Post-Secondary Resource Centre.

Further Reading

For anyone interested in learning more about the evolution of the Dacum system or with examining other issues involved in a competence-based approach to curriculum development, the following references are included:

"A Focus on Curriculum Development." **Adult Training**, Vol. 2 No. 4. Ottawa: Manpower and Immigration, 1977.

Designing a Curriculum (DACUM). Ottawa: Minister of the Department of Regional Economic Expansion, 1969.

Rice, Oliver. "Some Observation on the Women's Job Corps." **Audiovisual Instruction,** Vol. 13 No. 2, February 1968.

Adams, R.E. **DACUM Approach to Curriculum, Learning and Evaluation in Occupational Training.** Yarmouth, Nova Scotia: Nova Scotia NewStart Inc., 1972.

Handbook on Adult Curriculum Development. Ottawa: Canada Manpower and Immigration, 1974.

Performance/Competency Based Learning: Program Development in Newfoundland and Labrador. St. John's, Newfoundland: Department of Education.